



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

21 February 2018

MEMORANDUM FOR AFCEC/CZR

FROM: 92 ARW/CC
1 East Bong Street, Suite 221A
Fairchild AFB WA 99011

SUBJECT: Action Memorandum for Time Critical Removal Action of PFOS/PFOA

1. The Action Memorandum for Time Critical Removal Action (TCRA) Treatment of PFOS-PFOA Contaminated Water in the City of Airway Heights Municipal Well Near Fairchild Air Force Base (draft dated February 2018) has been reviewed. My understanding is that this TCRA authorizes the design and installation of a Granular Activated Carbon (GAC) treatment system for Airway Heights Well #9. This GAC system is proposed for installation in Spring 2018 timeframe at no cost to the City of Airway Heights. While this Action Memorandum details a cost estimate based upon one year (Summer 2018 peak water demand season) of Air Force funded operations and maintenance (O&M), the final terms and conditions for the time period in which the Air Force will support O&M on these systems has not been finalized. Based upon the understanding and caveats noted above, I have no further comments regarding the subject TCRA Action Memorandum.

2. I appreciate AFCEC's support of my concerns to date and urge prompt action to install this treatment system as soon as possible. My staff and I continue to stand ready to support any required action to assist our nearby impacted residents. Any questions may be directed to my Base Civil Engineer, Lieutenant Colonel Matthew Anderson, at DSN 657-2291.

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RYAN R. SAMUELSON, Colonel, USAF
Commander

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Date: 2018.02.23 08:51:16 -08'00'



ACTION MEMORANDUM
for a
TIME-CRITICAL REMOVAL ACTION
OF PFOS and PFOA-
CONTAMINATED WATER IN
MUNICIPAL WELL
At
Airway Heights,
Washington
by

FAIRCHILD AIR FORCE BASE, WASHINGTON

Prepared By
United States Air Force
Air Force Civil Engineer Center
Fairchild AFB, Washington

Draft
February 2018

**ACTION MEMORANDUM FOR A
TIME-CRITICAL REMOVAL ACTION OF PFOS- AND PFOA-
CONTAMINATED WATER IN MUNICIPAL WELL AT CITY OF
AIRWAY HEIGHTS NEAR
FAIRCHILD AIR FORCE BASE, WASHINGTON**

I. PURPOSE

The purpose of this Action Memorandum is to document the decision by the U.S. Air Force (USAF) to conduct a Time-Critical Removal Action (TCRA) in response to the presence of per- and polyfluorinated alkyl substances (PFAS) in one municipal drinking water well in Airway Heights, Washington, near Fairchild Air Force Base (AFB). Although the United States Environmental Protection Agency's (EPA) Office of Water (OW) has classified PFAS as contaminants of emerging concern, there are currently no federal or Washington State Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs) or promulgated cleanup levels regarding exposure levels. The EPA established health advisory (HA) values in 2016 that the USAF is using as benchmarks to determine if response actions are needed to provide alternative water supplies. The HA is in place since research has identified that there is potential risk to human health as a result of exposure to PFAS and regulatory standards are currently under consideration. HA values are developed to provide information in response to an urgent or rapidly developing situation. The HA values reflect reasonable, health-based hazard concentrations above which action should be taken to reduce exposure to unregulated contaminants in drinking water. The EPA will update HAs as additional information becomes available and can be evaluated.

The primary PFAS of concern for the Fairchild AFB and surrounding area are perfluorooctanesulfonic acid (PFOS), also known as perfluorooctane sulfonate, and perfluorooctanoic acid (PFOA). PFOS and PFOA were found in drinking water near Fairchild AFB at concentrations exceeding the HA. The HA for each is 0.07 micrograms per liter (µg/l) or 70 parts per trillion (ppt) either individually or in combination. The actions planned as part of this TCRA are designed to prevent, limit, and/or mitigate an imminent and substantial threat to public health.

This action memorandum is issued in accordance with, and satisfies the requirements of, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Title 42 United States Code (USC) §9604, as further implemented by the National Contingency Plan (NCP), Title 40 Code of Federal Regulations (CFR) §300.415. The USAF Installation Restoration Program (IRP) is authorized by the Defense Environmental Restoration Program (DERP) (Title 10 USC 2701 et. seq.). The DERP is the environmental restoration program the military services use to conduct CERCLA response actions and satisfy CERCLA lead agency functions as delegated by Executive Order 12580.

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

1. Physical Location and Description

Fairchild AFB is located in northeastern Washington, approximately 12 miles west of Spokane, in Spokane County, and encompasses approximately 4,300 acres (Figure 1). The installation is comprised of one major runway supported by numerous taxiways and support facilities, a medical clinic, housing units, and an elementary school. The City of Airway Heights lies northeast of Fairchild AFB, and the City of Medical Lake lies southwest of the installation. The Airway Heights water system serves 1,572 customers with a service population of approximately 8,425.

Fairchild AFB is identified on the National Priorities List (NPL) under CERCLA for four waste areas (EPA ID WA9571924647). The USAF, State of Washington, and the EPA entered into a Federal Facility Agreement (FFA) under CERCLA Section 120 in 1990.

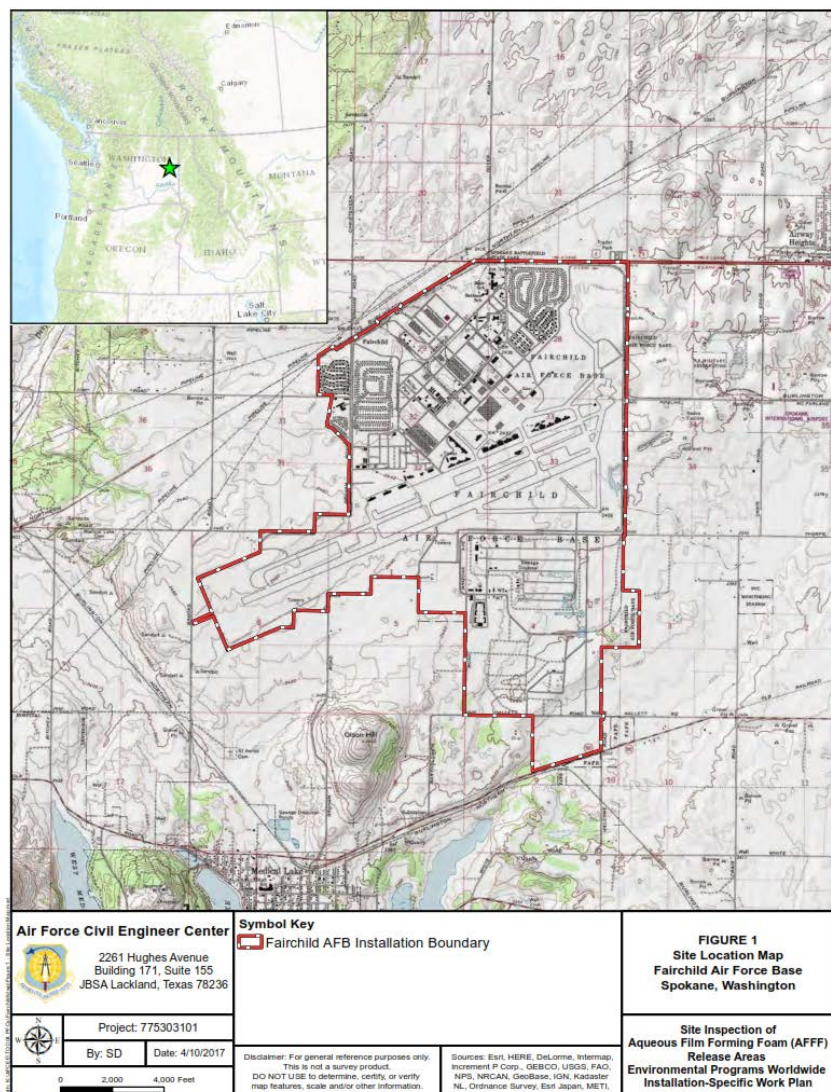


Figure 1 Fairchild AFB

2. Site Operations History

The installation was originally constructed in 1942 as a World War II repair and supply depot within the Cascade Mountains, 300 miles from the ocean, where it would be safe from Japanese attack. The installation was transferred to the Strategic Air Command in 1947 and became home of the 92nd Bombardment Wing. The 92nd Bomb Wing was re-designated the 92nd Air Refueling Wing in 1994, and the installation was transferred to the Air Mobility Command. Since 1994 the 92nd Air Refueling Wing has provided air refueling and wing supporting contingency operations around the world and today represents the largest air-refueling wing in the USAF as the backbone of the USAF's west coast tanker fleet.

3. Removal Site Evaluation

HydroGeoLogic, Inc. (HGL) and subcontractor CH2M HILL (the HGL team) were contracted by the Air Force Civil Engineer Center (AFCEC) to conduct a preliminary assessment (PA) of fire training area (FTA) and non-FTA sites at Fairchild AFB to determine locations of potential environmental release of PFAS from aqueous film-forming foam (AFFF) storage or usage areas (Air Force 2015). Three potential AFFF release areas were recommended for site inspection (SI) based on the results of the PA research. Two additional areas were subsequently recommended for SI based on data obtained during a scoping visit to the installation conducted by Amec Foster Wheeler in September 2016.

Initial SI activities to evaluate the potential presence of PFAS in soil and/or groundwater due to releases of AFFF were implemented in February 2017. Groundwater at the former FTA FT004 (FT01) exhibited concentrations of PFOS and PFOA above the HA of 0.07 µg/l. Based on these results, AFCEC authorized off-base sampling of groundwater monitoring wells, residential supply wells, and municipal supply wells. The analytical results confirmed the presence of PFOS and PFOA above the HA in residential and municipal wells, in addition to monitoring wells. The analytical results for two of the four municipal supply well locations sampled confirmed the presence of PFOS and PFOA above the HA. The municipal wells are Airway Heights #9 (Well 9) and Airway Heights Well P-1/4 (Well 1/4, two wells with combined flow at the wellhead). PFOS and PFOA were not detected in the other two municipal wells sampled, Airway Heights Park West and Medical Lake #4. All sample and analytical actions were conducted in accordance with the SI contract-wide Quality Program Plan (Air Force 2017a) and Installation Specific Work Plan (Air Force 2017b).

The TCRA presented in this Action Memorandum consists of municipal well water treatment for Airway Heights water system Well 9, where concentrations of PFOS and PFOA exceed the HA.

4. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant

Neither PFOS nor PFOA are listed CERCLA hazardous substances (40 CFR Part 302, Table 302.4). However, the USAF has determined that PFOS and PFOA are "CERCLA pollutants or contaminants." CERCLA defines pollutant or contaminant as essentially any

chemical that "...upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformation in such organisms or their offspring..." (42 USC § 9601(33)). The EPA and the Agency for Toxic Substances and Disease Registry (ATSDR) have reviewed the large toxicity databases for both PFOS and PFOA, summarizing the adverse effects to animals and humans following exposure. The agencies concluded there is ample evidence of adverse effects, particularly in animals.

Based on the PA and subsequent investigations conducted to date, the presence of PFOS and PFOA in groundwater confirms a release of a pollutant or contaminant has occurred. Although delineation of PFOS and PFOA in groundwater has not been completed, results of on-base and off-base groundwater sampling from monitoring, private, and municipal wells indicate a contaminant distribution pattern that is consistent with previously estimated groundwater flow directions at and near the base, to the east, southeast, north, and northwest. The detection of PFOS and PFOA at municipal and other wells northeast of the base suggests a potential for off-base flow to the northeast as well.

5. National Priorities List Status

Fairchild AFB is identified on the National Priorities List (NPL) for four waste areas covering 85 acres. The waste areas consist of: Building 1034 French drain and dry well system; two landfills, one northeast of Taxiway 8 and one at Craig Road; and industrial waste lagoons. Contaminants discovered during investigations include various volatile, semivolatile, and inorganic compounds. Fairchild AFB is participating in the IRP established in 1978, under which the Department of Defense (DoD) identifies, investigates, and cleans up contamination from hazardous substances, pollutants and contaminants. Remedial actions completed to date include residential well monitoring, installation of a landfill cap, groundwater containment and treatment, excavation and landfarming of soil, land use controls, soil vapor extraction, and groundwater monitoring. Remedial actions are ongoing (EPA, NPL website [<https://www.epa.gov/superfund/national-priorities-list-npl-sites-state#WA>], June 2017).

B. Other Actions to Date

1. Previous Actions

Previous PFAS actions conducted to date include the following.

- 2015 PFAS PA: Sixteen areas where AFFF was potentially stored, handled, used or released were identified, of those 16 areas; three were identified for further investigation through an SI;
- February 2017 initial SI investigation: PFOS and PFOA were identified at concentrations above the HAs in groundwater from five existing groundwater monitoring wells within the former FTA FT004 (FT01), including four wells at the eastern base boundary;
- April 2017 Phase 1: Sampling of 24 residential wells resulted in 18 residential wells with water concentrations of PFOS and/or PFOA above the HA;

- April 2017 Air Force emergency response action to provide bottled water to affected residents;
- May 2017 Phase 2: Sampling of 27 residential wells, 2 monitoring wells, and 4 municipal supply wells resulted in 3 residential wells and 2 municipal supply wells with water concentrations of PFOS and PFOA above the HAs;
- June 2017 Phase 3: Sampling of 12 on-base monitoring wells and 5 off-base monitoring wells in the vicinity of the Craig Road Landfill resulted in 3 wells on the northern boundary of the base with PFOS and/or PFOA above the HA; and sampling of 1 additional off-base residential well (b) (6) and effluent from the City's wastewater treatment plant also indicated concentrations of PFOS and/or PFOA above the HA;
- May and June 2017: USAF emergency response action to provide bottled water distribution to residents with private wells exceeding the HA, and bottled water distribution to residents of the City of Airway Heights in cooperation with City efforts; and
- May 2017: On-base SI at five AFFF areas identifying absence or presence of PFAS in soil and groundwater.
- July 2017 and through January 2018: Ongoing identification and sampling of private wells to the south, southeast, northwest, north, and northeast of the base; over 330 private wells have been sampled, with approximately 75 wells showing concentrations of PFOS and/or PFOA exceeding the HA value as of January 2018. In addition, private wells with detections of PFOS and/or PFOA below the HA value have been sampled on a quarterly basis to monitor concentrations over time.

2. Current Actions

Current PFAS actions include the following activities.

- Additional on- and off-base sampling of monitoring wells, residential wells, and/or municipal wells (as appropriate) to evaluate the potential for additional users of groundwater containing PFOS and/or PFOA above the HA; sampling of additional residential wells is currently underway.
- Periodic resampling of residential wells with detectable PFOS and/or PFOA below the HA.
- Development of conceptual design of in-home water treatment systems for residential wells testing above the HA, as presented in a separate Action Memorandum dated October 2017 (Air Force 2017c).
- Continuation of the program to provide bottled drinking water to residences and businesses testing above the HA.
- Continued use of City of Spokane water to supply the City of Airway Heights until municipal water can be treated for PFAS.

3. Planned Actions

Planned PFAS actions include the following.

- Continued use of City of Spokane water to supply the City of Airway Heights.
- Final design of a treatment system for Airway Heights Well 9.
- Installation of a treatment system for Airway Heights Well 9.

C. Federal, State and Local Roles

1. Federal Agencies

PFOS and PFOA are determined to be CERCLA pollutants and/or contaminants. The EPA's OW issued the lifetime drinking water HAs for PFOS, PFOA, and PFOS+PFOA. EPA Region 10 staff were involved in development of the SI scope of work, as well as the first phase of off-base residential well sampling. The EPA has also provided input to subsequent phases of residential, monitoring, and municipal well sampling, and is providing input for ongoing and planned sampling events. The EPA will continue to be involved in Fairchild AFB activities related to its NPL listing. The EPA will be provided an opportunity to review and comment on this Action Memorandum.

2. State Agencies

The Washington State Department of Ecology (Ecology) was involved in the development of the PFAS PA/SI, and has been informed of emergency actions taken by the USAF. The Washington State Department of Health (DOH) is aware of the contamination and is supporting the USAF and the City of Airway Heights by participating in public meetings and providing information to the public.

3. Local Authorities

Local authorities have been notified and include the City of Airway Heights, the City of Medical Lake, and the Spokane Regional Health District. Local authorities have supported the USAF by helping reserve public meeting locations, coordinating water distribution to residents, and speaking at some public meetings.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, STATUTORY AND REGULATORY AUTHORITIES

A. Threats to Public Health or Welfare

The USAF identified the existence of an immediate risk to public health or welfare due to the presence of PFOS/PFOA above the HA in active private residential drinking water wells and municipal wells.

Based on the current sampling data, the route of exposure is limited to ingestion of groundwater (drinking or using for cooking). Dermal absorption from PFAS in water (washing/bathing) is not considered a pathway of concern. Ingestion of water is the only pathway of concern at this time. Soil exposures are not currently believed to be a concern.

for the following reasons: 1) the only soil impacted above the EPA regional screening level of 1.6 parts per million (ppm) would be from surface releases of AFFF that occurred within the boundaries of the installation in areas with restricted access; and 2) dermal soil absorption from PFAS is not a pathway of concern.

The USAF is continuing to provide bottled drinking water to the affected private residences, and provided bottled water to residents and businesses of the City of Airway Heights until the City was able to successfully flush the municipal system with clean water from the City of Spokane.

This planned TCRA to address Well 9 will allow the City of Airway Heights to supplement use of City of Spokane water during the summer months when water demand increases beyond the capacity of the water system interties.

The initial assessment concludes that two municipal well locations (one well and one combined well) have been contaminated with PFOS and/or PFOA at concentrations above the HA. A TCRA is warranted to address the municipal water system based on the following factors listed in 40 CFR 300.415(b)(2) of the NCP:

- “Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;” and
- “Actual or potential contamination of drinking water supplies or sensitive ecosystems.”

This TCRA is required to provide a supplemental supply of clean drinking water to the recipients of Airway Heights municipal water during the high-demand summer months. Although the city currently is purchasing clean water from nearby Spokane, this arrangement is a temporary solution until Airway Heights wells are back online with effective treatment and the available supply from the City of Spokane intertie cannot meet summer peak demands.

B. Threats to the Environment

The threats to the environment posed by the PFAS contamination have not been quantified. This TCRA interrupts the currently known municipal water supply human pathways for PFOS/PFOA exposure. Individual residential wells are being addressed in a separate TCRA.

C. Statutory and Regulatory Authorities

PFOS and PFOA are not currently identified as hazardous chemicals as determined by CERCLA; however, application of CERCLA criteria suggests that it is appropriate to consider them to be pollutants and/or contaminants. The concentrations of PFOS/PFOA in the drinking water at off-base residential and municipal wells present an imminent and substantial threat to public health or welfare or the environment. The TCRA presented in this memorandum is consistent with 40 CFR §300.415(e)(9), which states a removal action is warranted for “Provision of alternative water supply - where necessary immediately to

reduce exposure to contaminated household water and continuing until local authorities can satisfy the need for a permanent remedy.”

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of pollutants and contaminants from Fairchild AFB may present an imminent and substantial endangerment to public health, or welfare, or the environment.

CERCLA and the NCP along with the EPA Office of Solid Waste and Emergency Response (OSWER) guidance equate “threat” and “danger” with “unacceptable risk” (see 42 USC § 9604(a)(1) and (b)(1)), 40 CFR § 300.430(d) and OSWER 9355.0-30, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, April 22, 1991. Normally under the NCP and the EPA’s guidance, an unacceptable human health risk is present when cumulative human health cancer risk exceeds 1×10^{-4} or the non-cancer hazard index exceeds one, or in drinking water if an MCL is exceeded. Risk-based cleanup levels under CERCLA and the EPA’s OW health advisories are set at levels below these unacceptable risk levels.

Accordingly, if PFOS or PFOA exist in a drinking water supply above these risk-based response action trigger levels, such levels could present an unacceptable risk, threat, and danger to human health. Specifically, in the case of PFOS and PFOA, because sampling shows exceedance of the respective HAs in actual drinking water, there are sufficient grounds to find that an imminent and substantial danger to human health may exist.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

The Removal Action Objective (RAO) of the TCRA is to eliminate the imminent and substantial danger to human health or the environment posed by PFOS and/or PFOA-contaminated water used as drinking water by providing a media treatment system, either granular activated carbon (GAC) or resin, at one of the municipal wellheads where water concentrations of PFOS and PFOA exceed the HA levels. The City is using an alternative water source to provide suitable drinking water to residents, however the water system intertie capacity is insufficient to meet peak summer-time water demand. This temporary system is required to meet peak summer-time water demand.

Treatment of water from Well 9 will be effected through installation of a mobile filtration system at the well location. The filtration system, to be installed on a gravel pad, will include the following components: GAC or resin vessels, bag filtration, booster pumps, and controls, as well as installation of all necessary piping, valves, and fittings. No protection will be provided for winter operation.

2. Contribution to Remedial Performance

Fairchild AFB is listed on the NPL of Federal Superfund sites by the EPA. The USAF, State of Washington, and the EPA then entered into the FFA for Fairchild AFB under CERCLA Section 120, which was signed in 1990. The FFA established the procedural framework and schedule for developing, implementing, and monitoring CERCLA response actions. An additional goal of the FFA was to integrate the USAF's CERCLA response obligations and Resource Conservation and Recovery Act (RCRA) corrective action obligations. The proposed TCRA achieves the general RAO associated with the drinking water by mitigating the immediate potential threat to human health and the environment. The objective will be met by eliminating the direct exposure of PFOS and PFOA ingestion from municipal water use by treating water at affected supply well Well 9. These actions ensure protectiveness; however, the USAF anticipates additional CERCLA related activities and is in the process of implementing an SI. The planned removal actions shall, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerned. Data collected during the course of this TCRA will be included in the overall analysis of the groundwater extent and ultimately used in determining a long-term solution.

3. Applicable or Relevant and Appropriate Requirements (ARARS)

There are no promulgated chemical specific ARARs for PFAS. In the absence of an ARAR, the HA value is being used to establish protective levels in drinking water. In the absence of ARARs, cleanup levels are based upon "...other reliable information..." (See 40 CFR § 300.430(e)(2)(i)). Reliable information is derived from other to-be-considered (TBC) criteria, advisories, or guidance (40 CFR § 300.400(g)(3)). The 2016 HA value issued by the EPA's OW for both PFOS and PFOA is based upon the OW's calculated reference dose, which is a tier 3 toxicity value. Therefore, in the absence of an ARAR, the HA value can be used as a protective level for human health in drinking water.

4. Project Schedule

The proposed TCRA design for municipal well water treatment is anticipated to be approved by the USAF, City of Airway Heights, and Washington Department of Health by April 2018. The equipment is anticipated to be installed and operational within 2 months of design approval. The priority, to eliminate or reduce the current threat, will be the removal of the PFAS contamination from the drinking water. The temporary system will augment water supplied by other sources during peak summer demand and will be dismantled upon implementation of a long-term solution. Expected operation is from June through October for the next three (3) years. Evaluation of long-term options will be conducted over the next several months and as information on plume extent and behavior becomes available.

A. Costs

The estimated cost for providing the temporary treatment system remediating water from Well 9 for summer peak demand, including design, installation, operation and maintenance for the life of the selected system, and associated reporting are estimated to be \$2,630,000.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Because of completed and ongoing emergency actions to provide bottled water, and currently City of Spokane water, to residents of the City of Airway Heights, there is no known ongoing current exposure to human receptors. The City continues to purchase water from the City of Spokane. The available water supply from the City of Spokane is not adequate during the summer and early fall when water use increases. If the action proposed in this Action Memorandum were not taken, water use restrictions would likely be needed during the summer and early fall.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues associated with this TCRA.

VIII. PUBLIC PARTICIPATION

The USAF is maintaining close communications with the local community and regulators. A public meeting was held on 23 May 2017, and USAF contact information was provided for community questions and input. This TCRA Action Memorandum will be included in the Administrative Record (AR) after a 30-day public comment period.

IX. ENFORCEMENT

There are no enforcement activities related to this TCRA. The USAF is conducting this removal action as part of DERP requirements.

X. RECOMMENDATION

This Action Memorandum documents the decision for the TCRA for PFOS and PFOA contaminated water in City of Airway Heights Well 9 near Fairchild AFB. This decision is developed in accordance with CERCLA as amended.

This decision is based on the AR file for the site. Conditions at the site meet the NCP section 300.415(b)(2) criteria for determining that the proposed removal action is appropriate. The EPA has been a participant in the planning of this action and supports the recommended action.

XI. REFERENCES

Air Force 2015. Final Preliminary Assessment Report For Perfluorinated Compounds at Fairchild Air Force Base Spokane, Washington, September 2015.

Air Force 2017a. Final Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas, Environmental Programs Worldwide, Quality Program Plan, March 2017.

Air Force 2017b. Final Installation-Specific Work Plan, Fairchild Air Force Base, WA, Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas, Environmental Programs Worldwide, April 2017.

Air Force 2017c. Action Memorandum for a Time-Critical Removal Action, Treatment of PFOS- and PFOA-Contaminated Water in Residential Wells Near Fairchild Air Force Base, Washington, October 2017.

XII. SIGNATURES

The signature documents the decision made to conduct the TCRA. The decision may be reviewed and modified in the future if new information becomes available that indicates the presence of pollutants or contaminants or exposures that may cause unacceptable risk to human health or the environment.

Time-Critical Removal Action Memorandum Approval

SUZANNE W. BILBREY, P.E., GS-15, DAF
Director, Environmental Management Directorate

DATE